

• BRIEF REPORTS •

## Misperceptions among patients with chronic hepatitis B in Singapore

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### Abstract

**AIM:** To identify the misperceptions among CHB patients, as well as to determine the factors associated with better knowledge.

**METHODS:** A telephone interview was conducted on 192 adult CHB patients, who earlier responded to an advertisement for free screening. The questionnaire included items about socio-demographic factors and a 14-item quiz on knowledge of general aspects, transmission, and management of HBV infection.

**RESULTS:** The mean knowledge score on HBV was 10.4/14. Common misperceptions included availability of treatment for HBV infection and early liver cancer, as well as on transmission. Having completed tertiary education was the only independent factor associated with a high knowledge score, after controlling other demographic factors.

**CONCLUSION:** More educational efforts should be focused on patients' misperceptions and target the less educated HBV carriers.

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**Key words:** Knowledge; Hepatitis B virus; Public health; Education

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### INTRODUCTION

HBV infection remains an important global health problem.

There are approximately 350 million people chronically infected with HBV worldwide. During the course of chronic HBV infection, an estimated 15-40% of HBV carriers would develop complications such as exacerbations of hepatitis, cirrhosis, liver failure, and hepatocellular carcinoma (HCC)<sup>[1,2]</sup>.

Singapore is a small, multi-racial nation in Southeast Asia with a population of four million, and racial distribution of 76% Chinese, 14% Malay, 8% Indian, and 2% others. HBV infection is an important disease in Singapore, where 4.1% of the general population are carriers of HBV<sup>[3]</sup>. In Singapore, liver cirrhosis and its complications are the 10<sup>th</sup> commonest cause of death, and HCC is the 4<sup>th</sup> commonest cancer among Singaporean males<sup>[4]</sup>.

Only patients with chronic hepatitis B (CHB), elevated liver enzymes and high hepatitis B viral load are candidates for anti-viral treatment<sup>[1,2,5]</sup>. As liver enzymes and viral replication may fluctuate during the prolonged course of CHB, regular measurement of liver panel and viral load is needed to identify suitable patients for antiviral therapy<sup>[1,2,5]</sup>. In addition, regular surveillance for HCC may allow diagnosis of early lesions, which are potentially curable by resection or liver transplantation<sup>[6,7]</sup>. To sum up, for the regular surveillance with liver panel and alpha-fetoprotein level, ultrasonography is important in the follow-up of patients with CHB to select suitable candidates for anti-viral therapy, and to diagnose complications early, for better treatment<sup>[1,2,8-10]</sup>. However, compliance of surveillance among patients with CHB has not been evaluated. Our recent pilot study showed that about two-thirds of HBV carriers in Singapore are not on regular follow-up, and the reasons are unclear<sup>[11]</sup>.

Many hepatitis B carriers are not aware of the implications of their disease, and have numerous misperceptions. In one study among 320 Cambodian American women, the median score on their knowledge is only 4.8 out of a maximum of 12<sup>[12]</sup>. In another similar study among 147 Chinese Canadian women, respondents correctly answered only 6.9 of the 12 questions<sup>[13]</sup>. At multivariate analysis, fluency in spoken English and duration of education are independently associated with the level of knowledge about HBV of patients.

We hypothesize that the low compliance with follow-up among HBV carriers could be due to their lack of knowledge about HBV infection. Hence, in this study, our first objective was to identify the misperceptions among HBV carriers attending a free screening program in Singapore, as well as any particular group with poor knowledge of HBV, and our second objective was to correlate their knowledge of HBV with regular follow-up.

## MATERIALS AND METHODS

### Patients

A free screening program for adult HBV carriers was advertised in local newspapers in Chinese and English over a 4-wk period. Known HBV carriers were invited to come forward for a free screening. HBV carrier status of all subjects was confirmed by repeat testing of the hepatitis B surface antigen. The study subjects came from the community and included those not screened previously, or defaulted screening.

Six hundred and nineteen subjects responded and came forward for the free screening program. These subjects were then contacted and invited to take part in this study. All subjects gave informed consent to the study. Three hundred and ninety-eight subjects could not be contacted due to incorrect contact information. Two hundred and twenty-one subjects were contacted, 29 of them refused to take part in the study. Hence, 192 (86.9%) subjects of those who could be contacted were interviewed for the current study. A waiver for application was obtained from the Institutional Review Board of the National University Hospital but, all study subjects gave informed consent before taking part in the study.

### Survey instrument

All subjects were interviewed through telephone, using a standard questionnaire by a team of bilingual (English and Chinese), hepatology-trained research nurses. The questionnaire contained questions on basic socio-demographic factors, and a 14-item quiz on general knowledge of HBV infection adapted from a previously validated questionnaire<sup>[12,13]</sup> (Table 1). The survey was carried out in either Mandarin or English. Each interview lasted for about 20 min. Carriers of HBV who were seen by any doctor for monitoring of their liver status and surveillance of complications of CHB over the last 12 mo were considered to be on regular follow-up.

### Data analysis

Data were expressed as mean $\pm$ SE unless otherwise stated, and analyzed by SPSS v. 10.0 (SPSS Inc., Chicago, IL, USA). The main outcome variables were level of knowledge about HBV. Each question was answered as "Yes", "No", or "Do not know". A correct answer scored one point. An incorrect or "Do not know" answer scored zero point. A summary score of knowledge was computed by summing correct responses to the 14-item quiz. Hence, the maximum score for each subject was 14 and the minimum 0.

Total knowledge score was first analyzed as a continuous variable. Factors associated with total knowledge score, namely gender, age, ethnicity, education level, income level, family history of HCC, and hepatitis B, were analyzed by multiple linear regression to evaluate the independent factors associated with knowledge score.

In addition, the knowledge score was arbitrarily dichotomized as "high" (10 or higher) and "low" (9 or less), and analyzed as a categorical variable. Factors related to high knowledge scores were first analyzed by univariate analysis, where categorical and continuous variables were analyzed by Fisher's exact test or Mann-Whitney *U* test as

appropriate. Factors with  $P < 0.10$  from univariate analysis were further analyzed by multivariate analysis using backward logistic regression to evaluate the significant independent factors associated with high knowledge scores.

Knowledge score between those with or without regular follow-up was compared by Kruskal-Wallis test. A two-tailed test with  $P < 0.05$  was considered statistically significant.

## RESULTS

### Patient characteristics

One hundred and ninety-two HBV carriers, aged  $43 \pm 1$  years, 148 (77%) male, and 184 (96%) Chinese, completed the survey. One hundred and thirty-five (70%) earned S \$ 2 000 (US \$ 1 100) or more monthly, and 64 (33%) had monthly income of S \$ 4 000 (US \$ 2 200) or more. One hundred and nine subjects (57%) completed tertiary (college) education, 76 (40%) secondary (up to Grade 12) education, and 7 (4%) primary (up to Grade 6) education. Sixty-seven subjects (35%) had a known family history of CHB and 35 (18%) had a known family history of HCC. One hundred and seven subjects (57%) were on regular follow-up for their CHB over the last 12 mo. None of the subjects consumed more than three drinks of alcohol per week.

### Hepatitis B knowledge

Overall mean knowledge score was  $10.4 \pm 0.1$ , out of a maximum of 14. More than 80% of study subjects were aware of that HBV was infectious and could cause long-term complications such as liver cirrhosis or HCC, and that they should not consume alcohol regularly (Table 1). More than 80% of subjects were also aware of the main modes of transmission such as childbirth, sexual activity, and sharing of needles.

However, many misperceptions existed. Only about one-third of them, knew that early liver cancer did not cause any symptom and treatment was available for CHB. Besides, half of the subjects were unaware of that HBV infection was not transmitted by sharing food, and 37% of the subjects thought that hepatitis B could be transmitted by taking seafood.

**Table 1** Responses to hepatitis B knowledge questions ( $n = 192$ )

Statements (correct response)	Correct response (%)
General aspects of hepatitis B	
Hepatitis B is infectious? (Yes)	165 (86)
Hepatitis B causes liver cancer in the long run (Yes)	173 (90)
Hepatitis B causes liver cirrhosis in the long run (Yes)	168 (88)
Hepatitis B carriers can be recognized easily from their appearance (No)	143 (75)
Hepatitis B carriers can drink alcohol as much as non-carriers (No)	180 (94)
Management of hepatitis B	
Treatment is available for hepatitis B (Yes)	65 (34)
Early liver cancer causes symptoms (No)	62 (32)
Early liver cancer is curable (Yes)	133 (69)
My family members should be screened for hepatitis B (Yes)	185 (96)
Transmission of hepatitis B	
Hepatitis B transmits through sexual intercourse (Yes)	171 (89)
Hepatitis B transmits through sharing of needles (Yes)	179 (93)
Hepatitis B transmits through sharing of food (No)	96 (50)
Hepatitis B transmits through taking seafood (No)	120 (63)
Hepatitis B transmits through childbirth (Yes)	165 (86)

### Factors associated with better knowledge

Knowledge score was first analyzed as a continuous variable. Multiple linear regression showed that having completed tertiary education was the only statistically significant factor associated with knowledge score ( $P < 0.001$ ), after controlling for other potential confounding demographic factors.

Knowledge score was then analyzed as a categorical variable as “high” and “low” knowledge score. Overall, 139 (73%) subjects had high knowledge scores of 10 points or more. Univariate analysis revealed that subjects with high knowledge scores were significantly younger, and more likely to have received tertiary (college) education. Association of high knowledge with higher income reached borderline significance (Table 2). When these three factors were analyzed by logistic regression, having completed tertiary (college) education was the only independent factor associated with high knowledge scores. Those with tertiary (college) education were 3.3 times more likely (OR 3.30, 95%CI 1.4-7.6,  $P = 0.005$ ) to have high knowledge score than those without tertiary (college) education.

### Correlation between regular follow-up and knowledge score

No statistically significant difference in knowledge score was seen between those with and without regular follow-up ( $10.7 \pm 0.2$  vs  $10.2 \pm 0.4$ ,  $P = 0.23$ ). Neither was there any difference in gender, age, income level, or educational level between the two groups.

## DISCUSSION

One important finding of this study is that the mean knowledge score was reasonably good at 10.3 out of a maximum of 14. We also found that 139 (73%) of the subjects scored 10 or more, i.e., having a high knowledge score. Although it is difficult to compare the knowledge score in our population with the scores from prior studies, this may suggest that public health education in Singapore in the past has been generally successful.

However, we also identified many misperceptions among HBV carriers. To begin with, many HBV carriers were not aware of the benefits of regular surveillance for complications of HBV, as evidenced by the findings that many were not aware that treatment of HBV infection was available and were not aware of that early liver cancer was asymptomatic, but potentially curable. Secondly, although many HBV carriers were aware of the common modes of HBV transmission, and believed that HBV infection could

also be transmitted by sharing food or consuming seafood. Our findings are consistent with those by Taylor *et al.*<sup>[12]</sup>, and Thompson *et al.*<sup>[13]</sup>, where only 23.5% and 41% of their respondents thought that HBV infection can be spread by food. This highlights the need to improve the current public education program on hepatitis B.

Another important finding of our study is that patients with tertiary (college) education were more likely to have a high knowledge score. This is not surprising as patients with better education are more likely to have read or heard about HBV infection in schools or in the mass media. Besides, subjects with better education were more likely to understand the complexity of various aspects of HBV infection. Our study highlights the importance of targeting further public and patient education on those with less or no education.

One last important finding is that we found no difference in knowledge score between those with and without regular follow-up. This highlights the complexity of the issue of regular follow-up among patients with chronic illnesses<sup>[14,15]</sup>, and that factors other than knowledge influenced patient compliance with follow-up. Perhaps efforts from community, healthcare organizations, and patients are needed in improving the long-term compliance rate. Further studies are needed to identify factor(s) associated with better compliance in patients with chronic illnesses.

There are limitations in our study. Firstly, it is unclear to what extent our conclusions could be extended to HBV carriers in other geographical locations, where cultural backgrounds and educational level vary. Secondly, as we interviewed only those who responded initially to our advertisement for free HBV screening, it is possible that we could have selected a more health-conscious group of HBV carriers, who might have better knowledge of HBV. However, it should be noted that any new screening program would have a low uptake in the beginning. The strength of this study is that we were able to identify the educational needs of individuals who participated in our screening program and this has helped us achieve two objectives. Firstly, it provided us with a better understanding of the level of awareness and misperceptions among individuals, who were sufficiently motivated to participate in our screening program in the first place. This information would help us identify strategies to improve their compliance with regular screening. Secondly, this study has prepared us better for the next phase of our study, that is, to assess the level of knowledge and misperceptions among HBV carriers in the general population, which may be lower than the

**Table 2** Factors associated with high and low scores on HBV knowledge

Factors	Low scores ( $\leq 9$ ) $n = 53$	High scores ( $\geq 10$ ) $n = 139$	Univariate analysis $P$	Multivariate analysis <sup>1</sup> $P$
Age (yr)	46 $\pm$ 1	41 $\pm$ 1	0.002	0.066
Male (%)	39 (74)	109 (78)	0.57	
Chinese (%)	52 (98)	132 (97)	1.00	
Monthly income $\geq$ S\$4 000 (%)	8 (15)	37 (27)	0.057	0.199
Family history of HBV (%)	19 (36)	48 (35)	0.87	
Family history of HCC (%)	11 (21)	24 (17)	0.68	
On regular follow-up (%)	61 (44)	78 (56)	0.91	
Tertiary educated (%)	17 (32)	92 (66)	<0.001	0.005

<sup>1</sup>Multivariate analysis using multiple regression analysis.

participants in our present study. Notwithstanding the above limitations, we believe our study provides important findings for public health officials, as well as hepatologists, to improve their patient education programs particularly for individuals who have been motivated to participate in screening, to ensure that they would not default follow-up after their first screening appointments.

In conclusion, many misperceptions exist among HBV carriers who participated in a screening program in Singapore and HBV carriers with better education are more likely to know HBV better. Future patient and public health education efforts should focus on dispelling misperceptions and target HBV carriers with less education.

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